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(54) Target game.

(57) A hand-held space aged type device emitting an infrared beam and a target/helmet which detects the beam and indicates the total number of such detections is described. The hand held device is in the shape of a hand gun and includes a two stage trigger. When the trigger is partially pulled back, a light illuminates the sight on the gun. When the trigger is wholly pulled back, an infrared beam is emitted from the barrel of the gun and a visible light flash is emitted in the direction the gun is aimed. The helmet/target includes an infrared detector with a 360 degree field of vision. Upon detecting a hit (positive detection of the infrared beam) in LED display mounted on the helmet is incremented by one. In the preferred embodiment, the helmet includes speakers emitting a heart beat like sound which increases in pulse, as if indicating increased stress, each time a hit is detected.

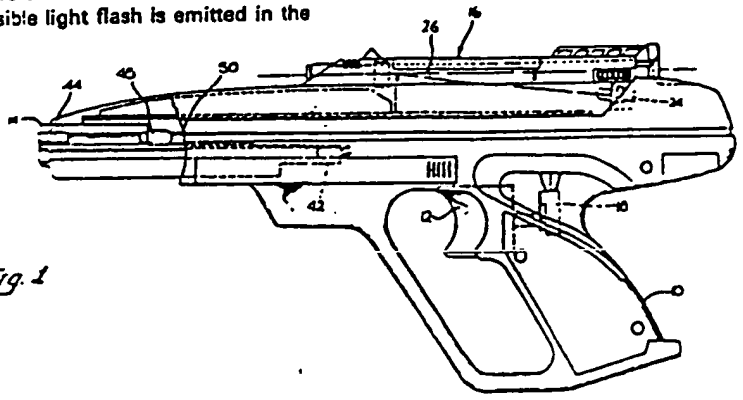

Fig. 1

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TARGET GAME

Background of the Invention

1. Field of the Invention.

This invention relates to the field of simulated toy weapons, particularly spaced aged laser type handguns, and a target game employing them.

2. Background Art.

A popular pastime with small children consists of battling each other with imaginary weapons. In the past, these miniature "wars" have taken the form of cops and robbers, cowboys and Indians, soldiers, etc. With the recent spate of futuristic, space-type adventure movies, the battles have evolved into a contest of ray guns and lasers. But no matter what the motif, these games have always suffered from an inability to fairly determine when a contestant has been in fact "hit" by the output of an imaginary weapon. Adults have solved this problem by staging war games with guns which shoot paint pellets, leaving an easily identifiable stain which indicates a "hit". However, such a method is too dangerous for small children in that physical contact is required to show a hit. It is desirable, from a child's point of view, to have a means of communicating a hit without the use of any actual projectiles. Recent advances in electronics and semiconductor technology now make it possible for real ray guns, firing a beam of light, to be used by children in their imaginative contests.

Therefore, it is an object of the present invention to provide a children's toy which produces a detectable beam of radiation when "fired".

It is a further object to provide means for a detector to be worn so that an indication will be made when the wearer is struck by a beam of radiation from an opponent's weapon.

It is yet another object of the present invention to provide a game with automatic scorekeeping abilities and enjoyable sound and light effects, to enhance the imaginary battles of children playing the game.

Brief Summary of the Invention

A hand-held space aged type device emitting an infrared beam and a target/helmet which detects the beam and indicates the total number of such detections is described. The hand held device is in the shape of a hand gun and includes a two stage trigger. When the trigger is partially pulled back, a light illuminates the sight on the gun. When the trigger is wholly pulled back, an infrared beam is emitted from the barrel of the gun and a visible light flash is emitted in the direction the gun is aimed. The helmet/target includes an infrared detector with a 360 degree field of vision. Upon detecting a hit (positive detection of the infrared beam) an LED display mounted on the helmet is incremented by one. In the preferred embodiment, the helmet includes speakers emitting a heart beat like sound which increases in pulse, as if indicating increased stress, each time a hit is detected.

Brief Description of the Drawings

Figure 1 is a side view of the space aged gun of the preferred embodiment of the present invention.

Figure 2 is a front view of the helmet target of the preferred embodiment of the present invention.

Figure 3 is a side view of the helmet of Figure 2.

Figure 4 is a block diagram of the circuit contained within the gun of Figure 1.

Figure 5 is a block diagram of the circuit contained within the target of Figures 2 and 3.

Detailed Description of the Invention

First referring to Figure 1, a side view of the gun of the present invention Target Game may be seen. The gun itself has an outer appearance like a space aged gun being characterized by, among other things, a hand grip 10, a trigger 12, a barrel 14 and sight generally indicated by the numeral 16. Contained within the gun is a battery power supply and electronics shown in detail in Figure 4. As shown therein the trigger switch 18, activated of course by trigger 12 of Figure 1, is a two step trigger switch, providing a first switch closure upon the partial pulling of the trigger 12, followed by a second switch closure which, as shall be seen, "fires" the gun.

As may be seen in Figure 4, partial pulling of the trigger to operate the first switch in the two step trigger switch 18 provides a switch closure signal on line 20, which turns on the main power 22, to turn on the sight light 24 and provide power for the remaining circuits in the gun. Thus, unless or until the trigger is at least partially pulled, power to all circuits is shut off, accordingly no other on/off switch is needed for the general electronics. The sight light 24, as may be seen in Figure 1, illuminates the forward portion of the sight 16 through an opening 26 in the gun body inclined approximately 6 degrees with respect to the sight tube so as to have the effect of illuminating the inner forward end of the site with physical light without emitting any significant light which in darkness might give away the location of the player using the gun.

Upon complete pulling of the trigger, a second switch closure signal on line 28, triggers a one shot circuit 30, which among other things, enables a noise generator 32, which provides both a signal through amplifier 34, to speaker 36, providing a noise of the type commonly associated with the fire of space weapon as in any of the recently made popular space movies and

television programs. In the preferred embodiment, the noise generator is a SN76477 noise generator manufactured by Texas Instruments with the parameters therefor in accordance with the manufacture's suggestions to generate the desired noise with the amplifier 34, being LM386 integrated power amplifier manufactured by National Semiconductor. Generator 32 provides a decaying type sound with feedback from the noise generator being used to reset the one shot circuit 30 in readiness for the next trigger pull.

The output of the one shot 30 is also coupled with a gating and one shot circuit 38 which, as shall be seen, controls various functions of the gun to effect its operation and enhance the illusion thereby. In particular, an oscillator 40 already powered by the partial pulling of the trigger through the main power supply 22, provides a 40 Khz signal to the gating and one shot circuit 38. The output of the one shot 30 triggers circuit 38 to provide a 40 Khz pulse to an infrared emitter 42 (see Figure 1) which projects the 40 Khz infrared beam out the end of one of the cylindrical openings in the end of barrel 14 of the gun. The 40 Khz frequency of the infrared pulse was chosen as being sufficiently high to be readily discernible from background infrared radiation, such as 120 Hz emissions of incandescent lamps and harmonics thereof etc., and yet to be sufficiently low as to be readily generated and detected in process with ordinary circuit components. In the preferred embodiment of the present invention, the 40 Khz infrared signal is maintained for approximately 100 milli-seconds or approximately 4,000 cycles, an almost continuous AC signal for detection purposes. The gating and one shot circuit 38 also triggers a flash lamp 44 for 100 milli-seconds. The flash lamp also being shown in Figure 1 providing a bright flash of visible light through a second tubular opening in barrel 14 to illuminate the barrel as well as

the point at which the gun is pointed. Finally the gating and one shot circuit 38 also triggers a decaying pulse generator 46 driving side lamps 48 mounted in region 50 of the gun (see Figure 1) behind red translucent window regions to provide an initially strong but decaying red glow in that region of the barrel as if the barrel were heated to red hot upon firing and slowly cooled so as to no longer glow. In the preferred embodiment, the decaying pulse generator comprises two transistors coupled as a darlington pair with a base of the first transistor being driven by an RC circuit triggered on by the complete pulling of the trigger with the darlington switch decaying to the off state as a charge on the capacitor of the RC circuit decays to the quiescent value.

Now referring to Figures 2 and 3, a front view and side view of the form of target for the preferred embodiment may be seen. In this embodiment the target is in the general form of a helmet, again having a space age like design, characterized in outer appearance by enlarged ear regions 51 and a top infrared transparent cap 52 housing an infrared detector 54 so as to effectively have a 360 degree field of view. Located within one of the protruding ear regions 51 is a speaker 56, for emitting sounds to a player wearing the helmet in a manner yet to be described. On the face of the helmet is an elongated red translucent window 58 behind which are eight LED's 60 which as shall be subsequently described are sequentially pulsed on from left to right then back to left, back to right, etc. as if scanning back and forth. Below the scanner are six additional individual LED's which as shall be subsequently seen, comprise a visually perceivable score keeping system.

A block diagram of the electronics in the helmet of Figures 2 and 3 may be seen in Figure 5. The LED's 60 of Figures 2 and 3, together with the associated electronics are shown as the

scanner electronics 62 operative from the system clocks 64. In particular, an inverter having the input thereof coupled to ground through a capacitor and the output thereof coupled back to the input through a resister forms a 10 hz oscillator, which in turn drives a three bit up/down counter completing a binary count upward from zero through seven, then back downward to zero, back up to seven, etc. The output of the counter is provided and coupled to a decoder which decodes the three bit binary input thereto to provide the sequential one of eight outputs to drive the eight LED's 60 in a sequential back and forth manner as described.

The infrared detector or receiver 54, shown in Figures 2 and 3, is also shown in Figure 5. The receiver provides a signal to a tone decoder 60, functioning as a frequency discrimination circuit to only detect signals at or about the 40 Khz frequency of oscillator 40 of Figure 4. The output of the tone decoder 60 is provided to the control delay logic 62, which controls the audio generation logic 64, providing a signal to audio amplifier 66 for the speaker 56 in the helmet. The output of the control delay logic is also coupled to a hit counter 68, which counts the number of hits on the infrared receiver 54 and provides that count to the hit display logic 70, which includes the six LED's 72 shown in Figures 2 and 3. The hit counter 68, in the preferred embodiment, is a binary coded digital upcounter coupled to the hit display logic 70, including a decoder to decode the count of one of the six LED's depending upon the decoded count. A second such decoder operates on the same input as the first to result in the same decoded count, the output of which determines the resultant coupling of the heartbeat tone control logic 74, which provides a signal to the audio generation logic 64 to provide an output for speaker 56 simulating a heartbeat sound having a pulse rate dependent upon the total count of the hit

counter. In particular when the hit counter 68 is reset to zero, the heartbeat tone control logic 74 generates the simulated heartbeat sound through speaker 56 of an ordinary pulse rate, but each time the player is hit or tagged by an opponent, the hit is registered by the hit counter 68 and the simulated heart rate is increased to simulate increasing stress. A side effect of the increasing heart rate is to audibly communicate to the player the current score as the LED's displaying the number of hits are not generally visible to the player himself. For each hit, the hit and end of play tone select 76 also controls the audio generation logic to provide a hit sound through speaker 56. The hit and end of play tone select 76 being coupled to the scanner electronic 62, primarily to use the low frequency of the scanner and to control the beginning and end of play tones provided distinctive indications of the ready and end of play status of the system.

In operation, at least two players are each equipped with a helmet/target and a ray gun. The helmet is powered up and the scanning LED's begin scanning back and forth. The scoring LED's are not lit at this time. The helmet speakers emit an alternating high and low tone to indicate the beginning of a game. After a short time, the alternating tones are replaced by the heartbeat sound at the slowest pulse frequency.

During play, each time a gun is fired, a futuristic sound is emitted from the gun's speaker, a flash is emitted and the red, slow decaying muzzle light is activated to simulate a hot barrel slowly cooling down. When a gun is aimed at the target of an opponent when fired, the opponent's helmet emits a "hit" sound, the scoring LED's are incremented by one, and the heartbeat sound increases its frequency. In the preferred embodiment, the game is played until a player is hit six times. At that point, the out of game sound is generated, consisting of alternating high low tones, and the heartbeat tone becomes a steady tone,

indicating no heart beat. To start a new game, the reset switch on the helmet is deactivated.

Although the target in the preferred embodiment is shown as a helmet, in an alternate embodiment, a chest plate or belted-on target could be utilized. Additionally, a 360 degree beam detector is not required. The detector may be configured so as to require a face to face hit before registering.

Thus a novel target game utilizing rayguns emitting infrared beams and detector which register hits when struck by such beams has been described.

CLAIMS

1. A target game comprising:

a gun having a trigger, and infrared light generating means rasponsive to the pulling of said trigger to direct a beam of infrared light in the form of a predetermined frequency infrared light pulse in the direction the gun is pointed, and

a target for wearing on the body of a player, said target having an infrared detector, a tone decoder, coupled to said infrared detector, a counter coupled to said tone decoder and a sound generator coupled to said counter, said infrared detector being a means for detecting an infrared light beam, said tone decoder being a frequency discrimination means for providing an output indicative of the detection of said predetermined frequency, said counter being a means for providing an output indicative of the number of occurrence of detection of said predetermined frequency, and said sound generator is a means for generating an audible sound responsive to the output of said counter and distinctively different for each number of occurrences of detection of said predetermined frequency,

whereby the player wearing said target will be informed of the number of times the infrared detector of the target receives the beam of infrared light from the gun by the distinctively different audible sounds emitted by said sound generator

2. The target game of Claim 1 wherein said target further comprises a visible means coupled to said counter for visibly indicating the total count thereof.

3. The target game of Claim 1 wherein said sound generator generates an audible sound simulating a heart beat at a pulse rate which increases with an increase in the count of said counter.

4. The target game of Claim 3 wherein said sound generator also generates an audible sound simulating an impact upon the occurrence of detection of said predetermined frequency.

5. The target game of Claim 1 wherein said gun also has a sight, and visible light means for illuminating said sight coupled so said trigger and responsive to the partial pulling thereof.

6. The target game of Claim 1 wherein said gun is further comprised of a noise generator responsive to the pulling of said trigger to simulate firing noises.

7. The target game of Claim 6 wherein said gun is further comprised of flash means responsive to the pulling of said trigger to provide a flash of visible light.

8. The target game of Claim 1 wherein said gun is further comprised of red light means and decaying pulse generating means, coupled thereto said decaying pulse generating means being a means for causing said red light means to glow and then fade out responsive to the pulling of said trigger.

9. The target game of Claim 1 wherein said target is in the form of a helmet, said infrared detector being positioned adjacent the top of said helmet so as to have a substantially 360^{o} field of view.

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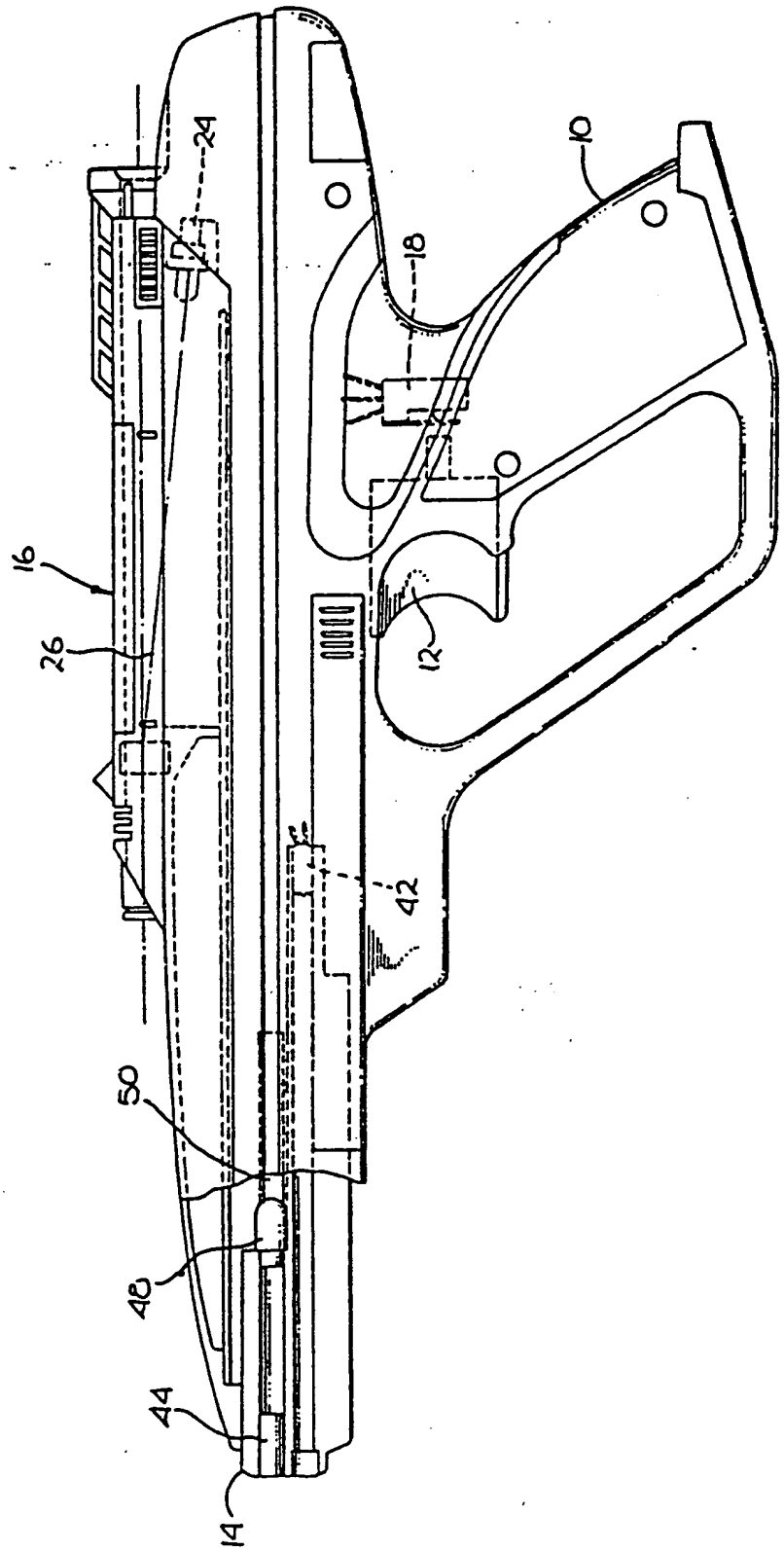
Fig. 1



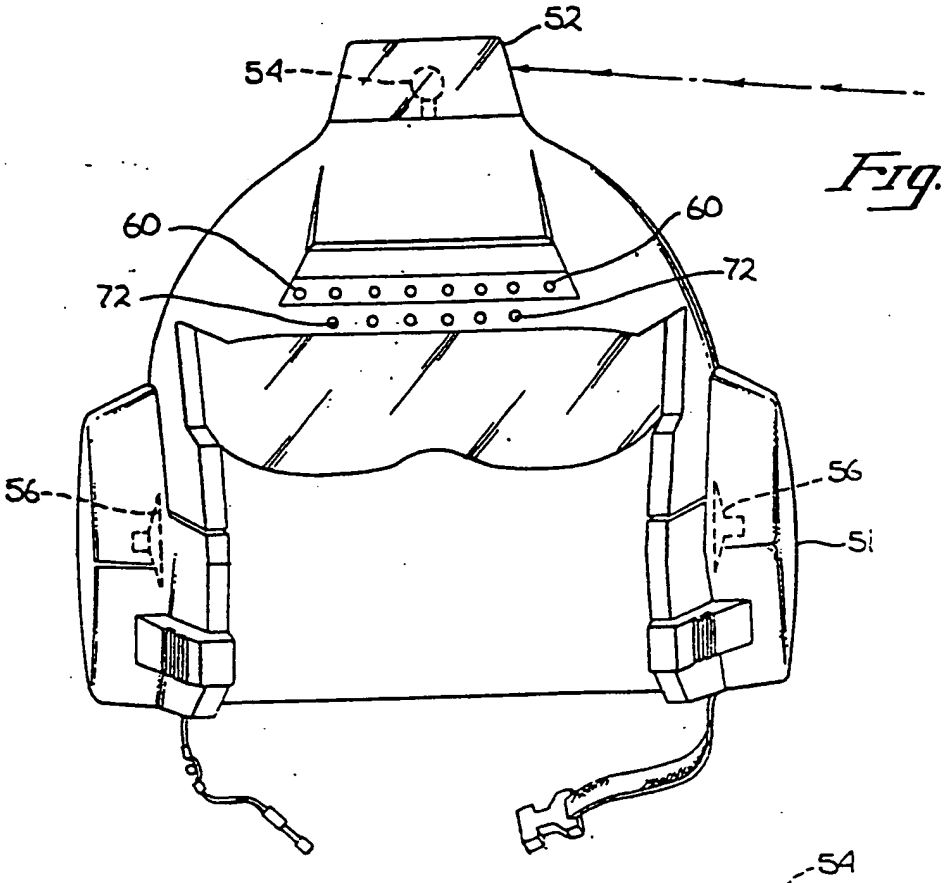


Fig. 2

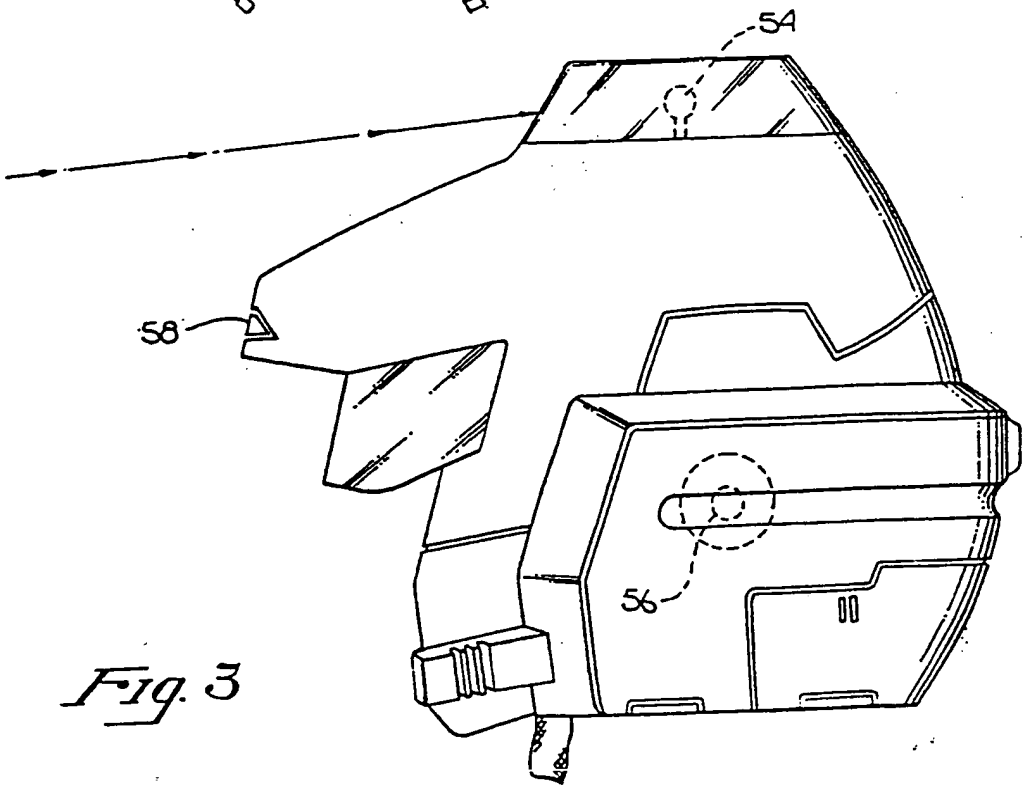


Fig. 3

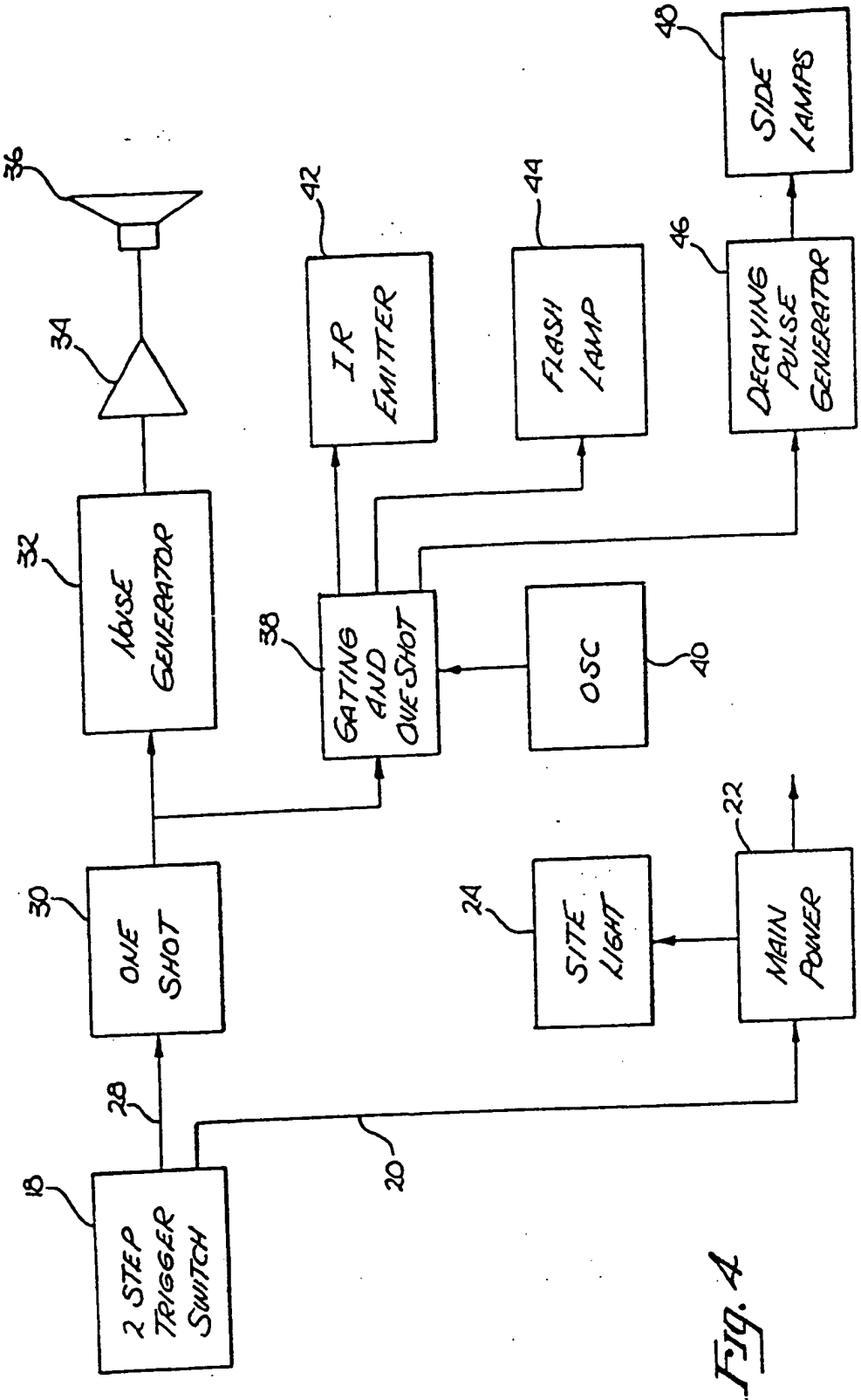

2 STEP TRIGGER SWITCH
18
28
20
ONE SHOT
30
NOISE GENERATOR
32
34
36
GATING AND ONE SHOT
38
OSC
40
IR EMITTER
42
FLASH LAMP
44
DECAYING PULSE GENERATOR
46
SIDE LAMPS
48
SITE LIGHT
24
MAIN POWER
22

Fig. 4

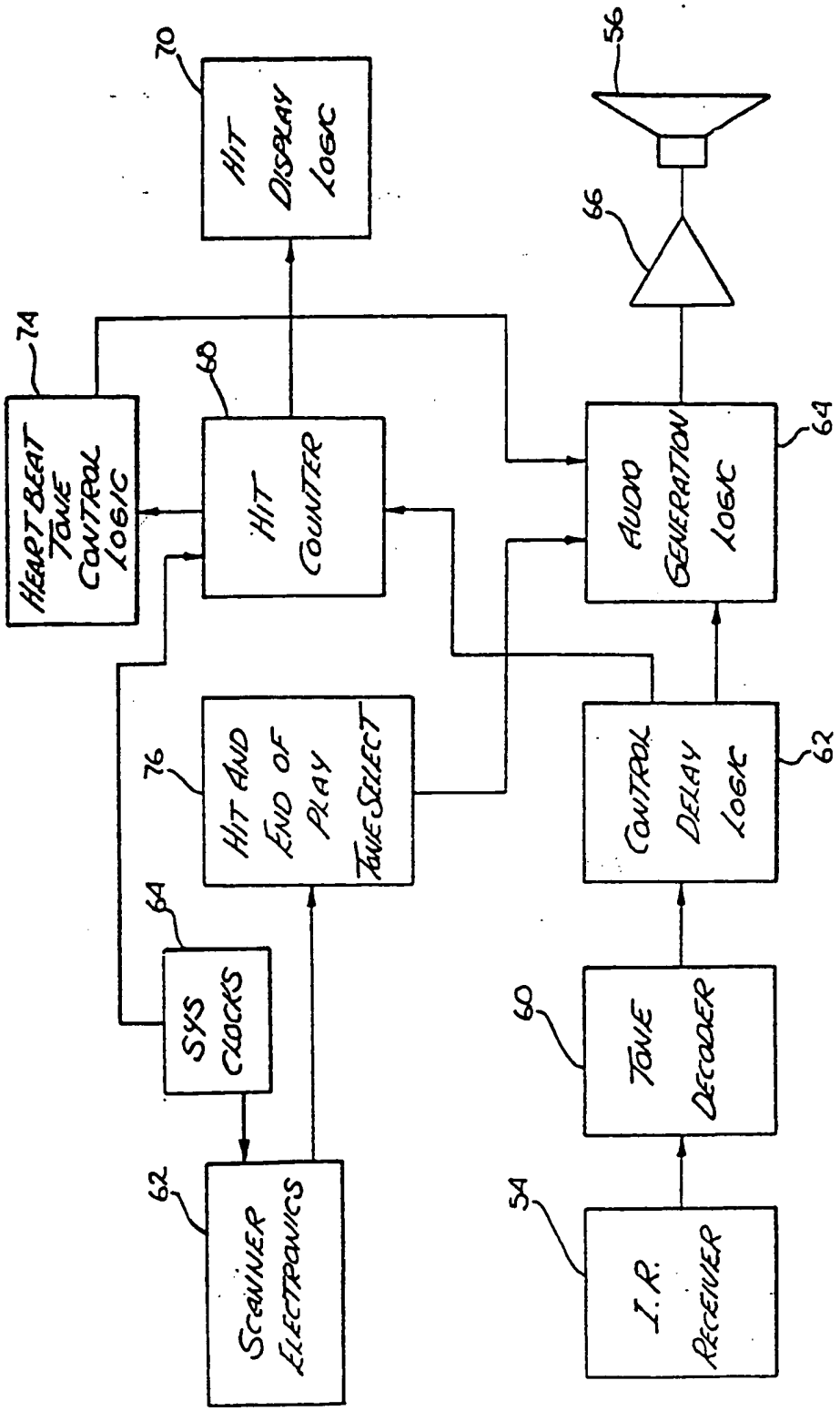

70
HIT DISPLAY LOGIC
56
66
74
HEART BEAT TONE CONTROL LOGIC
68
HIT COUNTER
AUDIO GENERATION LOGIC
64
76
HIT AND END OF PLAY TONE SELECT
CONTROL DELAY LOGIC
62
64
SYS CLOCKS
60
TONE DECODER
62
SCANNER ELECTRONICS
54
I.R. RECEIVER
TARGET ELECTRONICS

Fig. 5